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IN TWO SECTIONS

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EDITORIAL DEPARTMENT NOTE

Attempting to control the operations of a business with a fixed budget is somewhat similar to trying to drive a car on a winding road with a locked steering gear. Complete control is not possible in either case. To be most effective, our budget must tell us what results are to be accepted as satisfactory for each volume of business. Since all departments of a business usually do not work at the same capacity, flexible departmental budgets are important in providing a means of measuring the operations of each department in terms of what is accepted as satisfactory for the rate of which that department operates. In this way real control is achieved. This is well illustrated in the two articles in this issue of the Bulletin.

The author of the first article is Paul A. Wilks, who has been Chief Accountant for the Strathmore Paper Co. for the past six years. A graduate of Harvard College, Mr. Wilks began his business experience with the Milton Bradley Co. of Springfield, where he served as Head of the Cost Department for eight years before accepting his present position. He has served the Springfield Chapter in many capacities including the Presidency, which he held in 1934-35.

The author of the second article is Frank Klein, who was at one time Field Auditor of Income Tax with the Bureau of Internal Revenue. For the past twelve years Mr. Klein has been connected with the Worthington Pump & Machinery Corp., serving as Traveling Auditor, Chief Works Accountant, and, since 1927, as Director of Budgets. In this last position he has designed and supervised the installation of a complete budget throughout all plants and divisions of the Company's activities. Mr. Klein has been active in the work of the New York Chapter and is at present serving as Vice President. He has contributed in the past to a number of technical and trade journals and has been a speaker before several of our chapters.

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NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

JUNE 1, 1936

THE FLEXIBLE BUDGET SYSTEM AT STRATHMORE PAPER COMPANY

By Paul A. Wilks, Chief Accountant,
Strathmore Paper Company, West Springfield, Mass.

BEFORE describing the flexible budget setup now in use at Strathmore Paper Company, there is one thing that must be said: We have no idea that our plan is original with us. In developing the arrangements now being used, other organizations in this area were kind enough to tell us of their experiences along that line, because they had been using the flexible budget for some time past.

Weakness of the Fixed Budget

The idea of a budget which could reflect changing conditions grew up because our former plan was unsatisfactory. Then, as now, we drew up an annual budget and it was useful, as far as it went. However, when it came to comparing budget allowances with actual expense for a single period of four weeks, inaccuracies developed. What relation was there between one-thirteenth of an annual budget and the actual expenditures for a period? Suppose the foreman of a department showed actual expenditures below the budget allowance. Had he done a good job, or was his production so far below the anticipated production that it was almost impossible to make actual expenses reach budget? Executives couldn't answer those questions, so a means of control was lost; factory foremen couldn't answer those questions, and so lost interest in budget and cost problems.

Information Needed

About two years ago, preliminary work on a flexible budget was commenced. Investigation showed that certain information was necessary.

(1) The factory must be split into definite departments or production centers. Fortunately, we were so organized.

(2) The capacity of these production centers must be figured. First of all, we decided that a five-day week would be the basis in figuring capacity. Then we decided to use, as far as possible, standard hours as the unit in determining capacity—machine hours

wherever practicable, and man hours in most of the other cases. Where man hours were used, a standard crew capable of handling the maximum production from our paper machines was decided on.

(3) There must be a means of distributing manufacturing expenses among the different production centers. We were equipped to meet this problem, through what we call our Expense Detail Books.

(4) Expenditures are not all of the same type. Some, like the poor, are always with us; others are influenced by the amount of production. We grouped the items shown on the Expense Detail Books into three classes:

(a) Variable charges—those which have a definite relation to the amount of production. Direct labor is included in this group.

(b) Fixed charges—those not influenced by production.

(c) Prorated charges. Probably a word of explanation is needed here. We included in this group general mill expenses (including watchmen, janitors, general repairs, production executive charges, etc.) and power, heat and light charges.

Preliminary Decisions

Developing the information just outlined involved certain decisions before a satisfactory framework for our plan was available.

(1) The unit of measurement, in determining capacity, has been mentioned, but there was another problem in that connection. Our wage incentive system commences to pay a bonus when the worker reaches 60% efficiency. Naturally, the higher the efficiency level, the less time it takes to perform a given piece of work. The question arose as to whether the hours necessary at 60% efficiency, or at some other level, should be allowed in the budget. The final decision was to use the hours necessary when operations were performed at 100% efficiency. Two reasons dictated this choice:

(a) It is possible for 100% efficiency to be obtained by operators, working under normal conditions.

(b) It is felt that because departmental operation at lower than 100% efficiency tends to produce actual expenses in excess of allowance, the budget is an additional incentive for foremen to increase operating efficiency.

(2) The classification of some items of expense proved rather difficult. Perhaps the outstanding example was repair labor and material. Was it variable and therefore something a foreman could control? One of our mill superintendents answered this question, by asking that repair labor and material be included in variable expenses. He argued that the superintendent or foremen could influence repair charges by (a) watching his equipment and having work done before major difficulties developed, and (b) watching the repair gang actually at work on a job to see that no unnecessary time was taken.

We did realize that certain repair jobs are budgeted in advance, by mill executives. The budget allowances set for each department take such work into consideration.

(3) A few paragraphs back, prorated charges were mentioned. We decided to set up a flexible budget for these general charges in the same method as for any operating department, and to compare actual expenses with this budget. Then it was agreed to prorate the budget allowance among the departments on the same basis as expenses. For example, if expenses for general expense were 10% over budget for the mill as a whole, in each individual department, the expenses would maintain the same ratio.

The budget of general mill expenses as a whole gives executives a chance for control. In the proration between departments these expenses are not classified as variable, and hence the foreman is not held responsible.

Questions to Be Answered by the Flexible Budget

At this stage of the proceedings, we felt that our groundwork was laid. The next thing was to build up a budget from which rates and allowances could be set. So, when the sales research department forwarded to us the sales budget plans for 1935, we went to work. We had to produce answers to these questions:

1. What profit can the company expect from the anticipated sales?
2. What will the standard costs of our different lines be?
3. What effect will different levels of production have on our budget allowances?

Here is an outline of what was done: For each production center in the mill three budgets were worked out. One covered the anticipated cost of operating that production center at 100% of capacity, another the operating costs at 70% of capacity, and a third provided for the production scheduled as a result of the sales budget.

It might be said in passing that three budgets do not involve three times as much labor as one. Some expenses are fixed anyway, and many vary directly with production and so are easy to compute.

Once the three budgets were completed it was possible to answer the questions just outlined. The so-called production budget would give us the estimated profit for the year. The budget, based on using 70% of capacity, would provide the expense rates used in standard costs, because our standards are based on utilizing that much capacity.

Units Costs and Fixed Charge Allowances for Each Department

The flexible budget, however, made use of all three sets of figures. In every department we found the variable expense cost per unit at each level of operation. Wherever the unit cost was the same, or approximately the same, a standard rate per unit for all levels of operation was fixed. Where the unit cost for varying levels of operation differed noticeably, a curve was drawn and the unit cost was read from that. In Exhibit A the column headed "Variable Expense Allowance per Unit" shows the results. It will be noticed that mill general expense and power heat and light are treated the same as any production department. These expenses are prorated among departments as outlined above. Fixed charges were totaled and divided by thirteen to get the period allowance. The column headed "Period Allowance for Group A Charges" shows the results for each department.

So far this paper has covered the work done before the system was actually put into operation.

Use of the Budget Figures

Now assume that it is the end of a four-week period. The financial statements are being made ready for executives, and it is time to measure the performance of the manufacturing departments. How are the budget figures for a department built up?

EXHIBIT A

BUDGET ALLOWANCES

Unit budget allowances for expenses controlled by the superintendent or foreman, and the period total for Fixed (Group A) Charges are shown below. Where a curve is needed to obtain the unit budget allowance, it is so noted.

	Unit	*Variable Exp. Allowance per unit*	*Period Allow. for Group A charges*
Rag Room	Man hour	$ .43	$ 400
Rotary Bleach	Man hour	.70	100
Drainers	Man hour	.54	200
No. 1 Washers	Washer hour	.45	275
No. 1 Beaters	Beater hour	Curve	540
No. 1. Machine	Machine hour	5.10	1,100
No. 2 Machine	Machine hour	4.05	725
No. 1 Loft	Cwt. of paper	Curve	150
No. 2 Beaters and Washers	Beater hour	Curve	485
No. 3 Machine	Machine hour	5.03	1,070
No. 2 Loft	Cwt. of paper	Curve	175
Loft cutter	Machine hour	.50	100
Roll Pasting	Machine hour	2.58	270
Sheet Pasting	Man hour	.78	130
Platers	Machine hour—1 Table	2.40	400
	—4 Table	5.35	
Sheet Calender	Machine hour	1.30	140
Sorting	Man hour	.60	80
Trimming	Machine hour	1.10	130
Sealing	Man hour	5.04	10
Labeling	Man hour	1.53	12
Stack Calender	Machine hour	1.75	80
Rewinding and Sealing	Machine hour	1.08	30
Finishing Cutter	Machine hour	1.10	140
Finishing Room General	Direct labor dollar	Curve	500
Shipping Room	Man hour	2.68	475
Power, heat and light	Paper machine hour	Curve	1,800
Repair labor	Paper machine hour	1.52	—
Repair material	Paper machine hour	1.30	—

A chart is maintained for each department, which will reflect the relation between the budget and the actual charges for expenses controlled by the superintendent or foreman. On each chart this information will be shown:

1. Per cent of difference between actual cost and budget allowance per unit of operation.
2. Total actual cost and unit budget allowance for period and for year to date—shown in dollars.
3. Explanation of differences where margin between actual and budget is more than 10%.

This is a flexible budget. Therefore, changes appearing during the year—such as wage adjustments, setting of new standards or price changes for supplies—will be reflected through the change of budget allowances.

STRATHMORE PAPER COMPANY.

As an example, let's develop a period budget for No. 1 Paper Machine. During the period just ended this machine operated 420 standard hours. This information has been assembled daily on our standard cost control sheets. For each run of paper made the cost clerk has been told the actual hours of machine operation and the pounds of product produced. By dividing the actual pounds of product by the standard hourly production for this grade, size and weight, we know what time should have been consumed. To this total is added a standard allowance for setup. On No. 1 Machine the sum of the standard times for the period adds up to 420 hours. From Exhibit A we find that the variable expense allowance per paper machine hour is $5.10. (This figure, by the way, like all others in this table, is hypothetical.) 420 x $5.10 gives a variable expense budget allowance of $2,142.

Please notice two things about this figure:

(1) It is based entirely upon the paper actually made and the number of runs. There can be no evading the issue by saying that "I had a lot of slow-running paper this period" or "We didn't have much to do."

(2) It is based on standard allowances. No time spent in excess of standard is considered in the budget, which means probably that unless the difference between actual and standard has been small, expenses have exceeded budget. So much for the variable expense.

Exhibit A also shows that No. 1 Machine is allotted $1,100 per period for fixed charges, and that amount is added to the $2,142 allowed for variable expenses.

In addition we must consider the prorated charges. For the mill as a whole power charges were 90% of the budget for the period and general expense charges were 105% of budget. Assume that the machine was charged $900 for power and $525 for general expense. It has been said previously that ratio between actual expense and budget allowance would be the same for the individual production center as for the entire mill. Therefore, No. 1 Machine would be allowed $1,000 for power (actual charges are 90% of the amount allowed) and $500 for general expenses.

The total budget allowance for No. 1 Machine would then be:

Variable Expenses	$2,142
Group A Charges (fixed expenses)	1,100
Group B Charges (power and mill general)	1,500
Total	$4,742

Presentation in Reports

This figure would be checked against actual expenses for the period and the difference shown on the Budgeted Expense Gain or Loss Variance account on the financial statements. The net total of these differences is reflected on the operating statement as a variance from the standard cost of goods sold.

The financial statements, of course, go to the major executives, and show the entire story for each department of the business. Certain of the expenses for each department are beyond the control of a mill foreman and, because of that, we take the view that he is not vitally interested in them. Information on variable expenses, which he can control, is forwarded to each foreman, together with any necessary or desired information.

Exhibit B shows our method of presenting this information. It takes the form of a chart with a page of explanation attached. Let's consider some of the most important points in this exhibit.

On the chart the center line marks the budget allowance. Due to exigencies of production, the budget total for two periods in any production center is very rarely the same. For that reason the chart does not reflect the difference in dollars between actual expenses and budget allowances. What it does show is the per cent of variation between actual and budget, and from it, the situation can be told at a glance. The solid line shows the condition for any four-week period; the broken line shows the situation for the year to date. In some departments fluctuations between periods, of necessity, are rather sharp and, in such cases, the year to date line is of more importance. Use soon shows what to watch.

On the sheet attached to each chart are shown the dollars of expense and budget, as well as the per cents of difference which are indicated on the chart. It is interesting to know the dollars involved because they indicate where the best chances for savings

COMPARISON OF ACTUAL CHARGES AND BUDGET FOR CONTROLLABLE EXPENSE

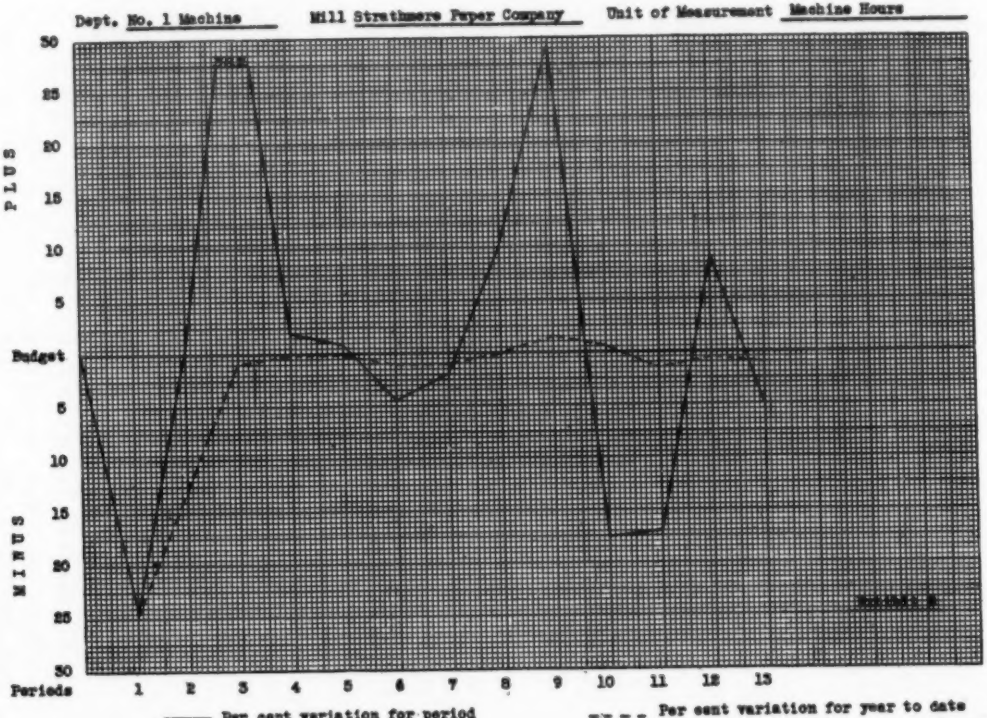

EXHIBIT B

DEPT. No. 1 MACHINE — DATA AND EXPLANATIONS FOR ABOVE CHART — MILL STRATHMORE PAPER COMPANY

PERIOD	BUDGET	ACTUAL	% PER.	% YR.	EXPLANATION OF LARGE VARIATIONS
1	1,341.00	1,012.88	75.5		WIRES AND JACKETS BUDGETED AT $85 - NOT USED REPAIR LABOR + MATERIAL - STOP LABOR - MISC. LABOR - BONUS + COLOR LABOR BELOW BUDGET 40%
2	1,209.00	1,210.07	100.1	87.2	
	2,550.00	2,222.95			
3	748.00	1,033.96	138.2	98.8	OPERATED 26.7 HRS. OVER STANDARD; BUDGET LOSS $86. DIRECT LABOR - MISC. LABOR - BONUS REPAIR LABOR SLIGHTLY OVER BUDGET. MACH. CLOTHING OVER BUDGET (2 NEW FELTS.)
	3,298.00	3,256.91			
4	1,383.00	1,412.86	102.2	99.6	
	4,681.00	4,669.77			
5	1,089.00	1,103.36	101.3	100.0	
	5,770.00	5,773.13			
6	1,497.00	1,429.03	95.5	99.1	
	7,267.00	7,202.16			
7	1,461.00	1,418.14	97.1	98.8	
	8,728.00	8,620.30			
8	969.00	1,066.56	110.0	99.9	
	9,697.00	9,686.86			
9	632.00	815.46	129.0	101.7	MAN. EFFICIENCY SHOWS A GAIN. MACHINE CLOTHING ABOVE BUDGET REPAIR MATERIAL OVER - REPAIRS TO TACHOMETER ($165)
	10,329.00	10,502.32			
10	697.00	575.36	82.5	100.5	MACHINE CLOTHING BELOW BUDGET
	11,026.00	11,077.68			
11	1,406.00	1,157.61	83.0	98.5	MACHINE CLOTHING BELOW BUDGET. ALSO REPAIR MATERIAL + LABOR AND SUPPLIES
	12,432.00	12,245.29			
12	1,160.00	1,265.74	109.1	99.4	
	13,592.00	13,511.03			
13	1,649.00	1,569.66	95.2	98.9	
	15,241.00	15,080.69			

are and because steadily increasing differences are apt to inspire more action. Wherever the variation between actual and budget is more than ten per cent, the reasons for this are indicated on this sheet. The sample shown gives examples of such explanations. We try to indicate where the difference comes and, as far as possible, why. We like particularly to stress cases where the department was not operated at 100% efficiency and thus to establish the connection between manufacturing and final efficiency. Wherever possible, we like to show the amounts involved, as, for example, "Repair material charges high (new gear, costing $75)."

Keeping the Factory Foreman Informed

Each factory foreman receives a binder containing charts for production centers under his control, and with it a note saying that a representative of the cost department will be around to discuss the results shown at approximately such and such time (at least twenty-four hours in advance). Meantime, the foreman is expected to look over his charts, and most of them do, and to jot down any points on which more information is desired.

One of the most encouraging features of the entire situation is that more and more questions are being asked. Moreover, these questions are dealing not only with past performance but also with how future situations will be reflected. The cost man answers as many questions as possible on the spot; those not answered are brought back to the cost department and answered promptly from there.

Revising the Budget Figures

So much for the routine operation of the flexible budget. Now let's turn to the question of changes in our figures. Changes in the character or amount of production are covered through the standard hours of operation, already described. Other types of changes have to be considered as they arise. For one thing we are having a new incentive system installed throughout the plant. As each additional production center goes on the new system our budget standards have to be checked thoroughly. Has the average production per hour been changed? If so, what will be the effect on the cost of supplies or expense materials? Will there be any change in the number of workers? All these questions

must be answered. Radical changes in production methods could cause revision. Changes in wage levels must be incorporated in the budget as well as any differences in the cost of expense materials or supplies.

When a change in a budget standard is necessary we do three things:

(1) Each item of variable expense is checked and changed if it has been affected by the new conditions.

(2) A new variable expense cost per unit is computed, and used from the time the new conditions arose.

(3) A memorandum is sent to the foreman of the production center involved, explaining the new conditions and the new budget allowance. Of course a copy of this memo is kept in the cost department.

Extra Time Required

The procedure for operating this flexible budget system may seem complicated and a great time-user. As a matter of fact, the extra time needed is not much. Some of the work is done as a part of the routine of preparing the period financial statements. The computing of standard units of operation and the budget allowance based on these units takes about four hours more than the old method of a flat budget allowance for each period. Preparing the budget books for the foreman takes another eight hours. The visit to the foreman and superintendents after the budget books have been sent out requires eight to ten hours more. Therefore, the flexible budget requires for each four-week period from twenty to twenty-two hours more than the old system entailed.

Benefits Derived

What benefits do we get as a result of these extra hours? So far, we cannot point definitely to any huge saving in dollars. We do see definite results, among them the following:

(1) All of us are becoming cost-minded. The discussions between the cost department representative and the factory man are becoming more and more pertinent. It is interesting to notice that all the questions are not of the general type. "What caused this or that?" Some of them ask, "What will be the effect of so and so?"

One foreman noticed that a repair man came frequently to his department to oil a certain machine—too frequently, he thought. A little investigation by the foreman brought forward a suggestion which has resulted in cheaper, more efficient and less frequent oiling.

A cost department telephone rang one day and this question was asked: "Have I exceeded by budget for general cleaning? I want to know if I can do a certain job without running over my allowance." We feel that examples like these just cited are a healthy sign

(2) The flexible budget system shows up otherwise undetected errors, both in the cost department and in the factory. One foreman protested bitterly that, for a given period, his sealing cost was too high. Investigation showed an error in the wrapper inventory he had furnished to the cost department.

A superintendent said that we were off on the charge for repair material. When we looked into this we found that he was right; the material in question should have been charged to the capital account.

(3) The flexible budget serves as another means of showing results of departmental inefficiency in operation. Remember that the budget is based on standard performance. Extra time costs money which is not balanced by a budget allowance. The fact that his department operated at only 70% efficiency may not mean so much as the fact that a $100 excess of actual expense over budget was due largely to this low efficiency.

(4) The operation of flexible budget provides opportunity for a periodic discussion between cost and operating men. We know that the cost department has obtained valuable information from these contacts; we hope that the factory feels the same way. There seems to be a greater feeling of co-operation on both sides than existed a year or so ago.

What is the future of our flexible budget system? Of course we cannot be certain. We hope to see it accepted more and more as a basis for executive judgment and action. We rather expect to see it used in the not too distant future as the foundation for a bonus given to factory supervisors. We hope to look at some large saving and to be able to say, "The budget made this possible."

Meanwhile, we find that its operation and the efforts to im-

prove it are just as interesting as laying the groundwork and developing the plan. We believe that others embarking on such a scheme will secure results similar to and, very possibly, even more profitable than ours.

SOME DEVELOPMENTS IN VARIABLE BUDGETING

By Frank Klein, Director of Budgets
Worthington Pump and Machinery Corp., Harrison, N. J.

AT THE outset, let me assure you that budgets need not be complex, nor need they be difficult to understand or to operate. In fact any person who is able to plan the detailed affairs of a business, or any part of it, is capable also of budgeting those operations because budgeting is simply *reducing profit plans to concise orderly written specifications, all of which, when followed, lead to the desired result.* If you will eliminate from your consideration for the time being, any more technical interpretation or construction of the word "budgeting" it will probably facilitate our discussion of this subject.

Functions of a Budget

A budget, in general, is a tool of management control and has three principal functions:

1. To permit a formal and detailed forecast of the operating results for a coming period.
2. To apply *in advance* the necessary correctives if the forecast indicates an unsatisfactory result.
3. To take action promptly on any deviation of actual operations from the desired result.

Please note that all three functions are strictly of a control nature, first to guide operations toward the desired profit goal, and next, to maintain that direction by taking necessary steps from time to time to insure the desired result.

Why Is a Budget Desirable?

Let us pause just for a moment to consider why any such detailed planning of business operations should be desirable or necessary

(a) I believe we agree that the objective of management in all commercial organizations is to preserve intact the investment entrusted to it, and to return to the owners a reasonable rental price for the use of such investment fund.

(b) I am sure that we also agree that the motivating force of all business is the income received from sale of the product or service, and that all items of expense and cost must be related and subordinated to such income.

(c) Therefore any plan which makes it possible to determine the *proper relationships of all expenses and costs to the volume of business done,* simplifies the problem of management in maintaining such relationships, and in obtaining the consequent profits.

We are now ready to proceed to a direct consideration of budgets, and I suggest that we keep in mind the point which has been made, i.e., that budgets are intended to assure proper relationship of expenses and costs to the amount of work done.

Three Steps in Controlling Departmental Expenses

There are various types of expenses in every organization, and it is natural that the problems of control should differ with these dissimilar expense groupings. For instance, while our accounting report may show the amount of billings, and then relate selling, general administrative, and plant indirect expenses, each to such billings, we know that for effective control purposes selling expenses should not be related to billings, but rather to the results produced by the sales effort—bookings. Similarly, plant indirect expenses are not directly related to billings, because billings may vary radically from plant production, due to changes in manufactured inventories. Therefore, what may be correct accounting practice for a financial statement of past operations, may not be satisfactory procedure for control purposes.

The first step in controlling the expense of any department is the determination of the function of that department. In the case of the sales department it is the booking of orders.

The second step is the allowance or apportionment of expense to the department in order that it may properly perform its function. To revert again to the sales department, the expense allow-

ance or budget would be based on the quota or volume of orders which the department was expected to book.

The third step is the determination of whether the expense allowance or budget should be apportioned out each week or month on the basis of the actual amount of results produced in that period, or whether the amount of expense allowance should remain fixed during the entire budget period, which is usually a year. If the amount of work performed cannot be measured by the results produced in short periods, like a week or month, then fixed allowances or budgets should be used. Consider the sales department again which may be charged with the responsibility of booking $10,000,000 of product in the year 1936. An advertising campaign may be run during the year. This may be followed up by dealer contacts. Although expenses may have proceeded at a regular pace each month, the effects of the sales campaign and the personal follow-up may not be reflected in bookings until mid-year and afterward. It is obvious that in this department, the two following points must be observed:

1. A sales quota for the budget period must be established, and this divided by months will show the monthly sales quota.
2. The sales expenses necessary to produce the booking quota for the budget period must be determined, and when divided by the number of months, will show the fixed monthly expense budget.

Illustration of the Fixed Budget

If you will now turn to Exhibit 1 you will see a simple form of the fixed type of expense budget. When the quota for this department for 1935 was established it was placed on the bottom line of the budget column in the "Period" section. The expenses calculated as necessary to produce this volume of bookings were established as the expense budget and shown in their respective classifications in the "Period" budget column. All expense budgets and the booking quota were then divided by twelve to show the fixed expense budget and quota per month during the year 1936.

If all sales department budget sheets are summarized, the total corporation booking quota and sales expense budget will be shown. Copies of all sheets and the summary are furnished to the chief

H.O. 1932-1-35

EXHIBIT 1.

SELLING EXPENSE
BUDGET AND ACTUAL

Office or Department "B" DISTRICT OFFICE

Month and Period From January 1st ending December, 1935

No.		MONTH			PERIOD		
		BUDGET	ACTUAL	UNDER-OVER BUDGET	BUDGET	ACTUAL	UNDER-OVER BUDGET
1	Salaries	1,635	1,662	27x	19,620	19,870	250x
2	Traveling	200	229	29x	2,400	2,676	276x
2A	Auto Expense	275	240	35	3,300	3,545	245x
3	Entertaining	45	34	11	540	480	60
4-5	Cont,Heat,Light,Power	295	312	17x	3,540	3,593	53x
6	Stat'y,Printing& Supplies	35	46	11x	420	432	12x
7	Postage	40	74	34x	480	324	156
8	Telegraph	35	62	27x	420	513	93x
9	Telephone	50	56	6x	600	699	99x
11	Equip. Rep.& Replace't	6	3	3	72	58	14
13	Personnel Adjustments						
14-5	Dues,Donat'ns & Subs.	7	-	7	84	66	18
16	Insurance						
17	Taxes,Lic.& Franchises						
18	Depreciation						
20	Service Work Debit		130x			130x	
20	" " Credit		-			-	
20	" " Net	-	130x	130	-	130x	130
22	Demonstration Expense	5	-	5	60	17	43
24	Miscellaneous	15	92	77x	180	254	74x
25	Commissions	35	58	23x	420	309	111
27	Sales Policy Allow.	15	45	30x	180	267	87x
28	Consigned Stock Exp.	20	30	10x	240	368	128x
29	Sales Bonus	-	33	33x	-	368	368x
45	Conventions & Exhibits	2	-	2	24	65	41x
75	Sales Conference Exp.	10	-	10	120	14	106
90-1	NRA Dues and Expenses						
	Advertising Items						
	Total	2,725	2,846	121x	32,700	33,785	1,085x
21	Demonstration Equip't					589	
21A	Less:Chgd. Off Prior '35					509x	
	Demonstration Equip-Bal.				-	157	157x
	GRAND TOTAL-ABOVE EXP.	2,725	2,846	121x	32,700	33,942	1,242x
	BOOKINGS-QUOTA & ACTUAL	54,035	48,431	5,604x	648,420	645,772	2,648x

x Indicates red figures.

Red Figures Denote:
Expenses Over Budget
Bookings Under Quota

sales executives, and of course, individual sheets furnished to the respective department heads or supervisors as their guide for expected bookings and expenses

The same form is also used for reporting each month the budget and actual expenses and quota and actual bookings for the month and period to date, as shown on the exhibit just discussed.

Other examples of fixed budgets might include geenral administrative expenses, closed plant expenses, development expenses, etc.

Need for Variable Budgets

There are certain types of expenses, however, that are not of a fixed nature, notably plant indirect expenses. Here the problem is to find a means for allowing the correct amount of expenses necessary to produce any given volume of production. Many budgets, in years past, and some even recently, neglected to provide a variable budget for plant expenses. A variable budget is so important that I cannot see how any business can effectively budget its operations without one. Just take the case of a fixed plant expense budget. It is usually based on the expense incidental to producing the exact amount of the sales quota. The annual expense will be divided by 12 or 52, depending on whether the report period is to be a month or a week, and this amount of expense will be provided each period regardless of the flow of work through the plant which may vary quite radically from month to month. Since we all know expenses do not vary in direct proportion to volume, of what use is an expense budget set for say $500,000 production a month, when actual production happens to be $300,000 for the month.

It follows that a budget to be effective in the control of plant expenses, must recognize the many variations in production that will occur throughout the year, and anticipate them by providing the proper expense allowance for any capacity that may be worked.

Let us now consider in detail how a variable expense budget may be established, having in mind that the purpose of all expense budgets, as stated before, is to determine the proper amount of expense to be allowed for performing a given amount of work.

Establishment of Capacities

We shall assume that good accounting practice has provided an *adequate classification of all expenses,* so that it is not necessary to refer back to original data to determine the nature of the various items of expense as listed on the expense reports.

We shall also assume that in recognition of the budget principle of allocating responsibility for expenses to the person who incurs them, that the *plant has been sub-departmentalized* by individual foremen's or supervisors' responsibility.

The first step then is to determine the productive facilities of any producing department, or what amount of work that department is capable of turning out. This is called the calculation of operating capacity and is arrived at as follows:

Assume that Department A is supervised by Foreman Harris. There are 50 drilling machines in the department, and the normal working week is 40 hours. The total possible output of the department if every machine worked every hour of the regular working week would be 50 x 40 or 2,000 productive hours, and this would be considered 100% capacity. It is true that rarely will work be so balanced, or the productive facilities in such perfect condition that every machine in a department will work every hour in the week. But for budget purposes the total possible production at 100% capacity is used and set down on the top line of the budget form as shown on Exhibit 2 These would be reduced in steps of 5% to 50% capacity, which would then show the productive hours that would be produced by the department over a range of capacities from 50% to 100% in even steps of 5%.

If the department processed a uniform product it would be a simple matter to convert the productive hours to units of product, or to values of billings produced. However in our example, various kinds of products are being processed in the same department so that the only uniform measure of output is the productive hour. The principle here is *that whatever basis will best measure the volume of productive work turned out is the basis to be used in determining operating capacities.*

Determination of Expense Allowances

The next step is a study of the amounts of the various kinds of expenses that are necessary for the department to function prop-

WK 707-1-34-1134 WORTHINGTON PUMP AND MACHINERY CORPORATION EXHIBIT 2.

WORKS INDIRECT EXPENSE BUDGETS PER WEEK FOR VARIOUS OPERATING CAPACITIES

W WORKS

A DEPT.

REVISED 1/1/36 1 WEEKS Harris FOREMAN

	DIRECT HOURS	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700	1,800	1,900	2,000
NO.	PER CENT CAPACITY	80	55	60	65	70	75	80	85	90	95	100
01	Executive Staff											
02	Foremen	35	35	35	35	35	45	45	45	45	45	45
03	Inspectors											
04	Clerical	27	27	28	28	29	29	30	30	31	31	32
	Total Superv. & Cler.	62	62	63	63	64	74	75	75	76	76	77
10	Guards & Gatemen											
11	Oilers, Sweep. and Clean.	10	11	12	13	14	15	16	17	18	19	20
12	Internal Transportation	7	7	7	8	8	8	9	9	9	10	10
13	Personnel Adjustments											
14	Idle or Lost Time											
15	Other Indirect Labor	35	39	41	44	47	50	53	56	59	62	65
	Total Indirect Labor	52	56	60	65	69	73	78	82	86	91	96
20	Fuel											
21	Sand											
22	Nails, Rods and Wires											
23	Binders and Facings											
24	Grinding & Polishing Wheels	4	4	5	5	6	6	7	7	8	8	9
25	Paints, Lubricants & Waste	5	5	5	6	6	6	7	7	7	8	8
26	Stationery & Office Supplies	1	1	1	1	1	1	2	2	2	2	2
27	Miscellaneous Supplies	5	5	5	5	5	5	5	6	6	6	6
28	Purchased Electricity											
	Total Operating Supplies	15	15	16	17	18	18	21	22	23	24	25
40	Real Estate											
41	Buildings											
42	Machinery	30	33	36	39	42	45	48	51	54	57	60
43	Motors	6	7	7	8	8	9	9	10	10	11	11
44	Semi-durable Tools & Inst.	90	99	108	117	126	135	144	153	162	171	180
45	Internal Transp. Equip't											
46	Carting Equipment											
47	Furniture and Office Appl.											
48	Flask Equipment											
49	Patterns											
50	Miscellaneous Equipment	4	4	4	4	4	4	4	4	4	4	4
	Total Maintenance	130	143	155	168	180	193	205	218	230	243	255
60	Re-arrangement of Equip't											
61	Postage											
62	Telephone											
63	Telegraph and Cable											
64	Inventory Adjustment											
65	Employees' Welfare	2	2	2	2	3	3	3	3	3	3	3
66	Liability Insurance											
67	Dues and Subscriptions											
68	Gratuities											
69	Rentals											
70												
71	Miscellaneous Expense	4	4	4	4	4	4	4	5	5	5	5
	Total Sundries	6	6	6	6	7	7	7	8	8	8	8
	Total Above Charges	265	282	300	319	338	365	386	406	423	442	460
80	Depreciation											
81	Insurance											
82	Taxes											
	Total Fixed Charges											
	Total all Charges											

erly. Please refer again to Exhibit 2 and assume the report of labor shows that this department is currently working about 1,300 direct hours a week. That corresponds to 65% of operating capacity.

All expenses of the department, item by item, will then be reviewed by the budget man and the foreman. The function of every indirect worker will be questioned. Can certain routines be eliminated, curtailed, or simplified? How about the various supplies used? Would greater care in their use result in economies? Was the foreman previously aware of the cost of the supplies he may have so freely used in the past? What is the condition of the productive facilities, and the probable maintenance work that will be required if operations continue as at present? Throughout this study, past expenses and costs are not an important guide because they were probably related to a different rate of operations, to an economic period representing higher or lower prices than the present one, and to a period when the plant property was in better or worse condition than the present. Practically never are all three of these factors static over a period of time, so that rarely, if ever, can comparisons with the past be effective as guides for the present or future.

If the review of all expenses, as outlined, has been made conscientiously by both the foreman and budget man, with the assistance of the superintendent of maintenance on the budgeted maintenance items, the result will be a list of minimum expenses necessary to operate the department at its present rate of 65% capacity.

Allowable Expenses for Different Capacities

It is now necessary to proceed with the additional step which a number of organizations have neglected to take in the past. That is the determination of the extent to which each of the budgeted expenses should increase or decrease with changes in production. With the detailed study that has been made of each expense item, and its requirements in the production scheme of the department, a pretty clear conception has been gained of just what part each expense plays in the output of the department.

For instance, certain items of supplies become a minor part of the product and are consequently used in direct proportion to the volume produced. Therefore, such supply items are increased or

decreased in direct proportion to the operating capacity. Other supplies are of a general department nature which, like cleaning supplies, fluctuate little with actual capacity worked. Similar studies of indirect labor show when extra help may be needed or dropped. Maintenance items are similarly studied. It is true that maintenance of buildings continues at a fairly uniform rate regardless of capacity worked. On the other hand, many items of equipment that have moving parts, wear, and require repairs in proportion to the extent that they are used or operated. If adequate classifications for each type of expense and equipment have been provided, it will be seen that provision can be made for listing the extent to which each such expense item should vary as the productive volume of the department changes. When the column for each capacity is totaled, the total budgeted expense allowance for the department for any operating capacity is obtained.

Similar sheets are prepared for each productive department, and a summary of them all will show the total plant capacity in productive hours, and the total productive departments' expenses necessary to operate at any given volume of capacity.

The service departments, such as purchasing, stores, accounting, routing, and garage, have no productive hours of their own on which to base their activities, and their consequent expense allowances. As the amount of work which each of these departments must perform is dictated more or less by the entire plant activity the general operating capacity of the total plant as shown by the sum of all productive departments' hours, is the basis for varying the expense allowances or budgets of the service departments.

A summary of all expense budgets for productive and service departments will then show the entire plant's expense requirements for any given rate of operating capacity.

Operation of the Variable Expense Budget

Each foreman or department head is furnished with a copy of his budget sheet as shown on Exhibit 2. Please note that he has collaborated in its preparation, and it is therefore his commitment to maintain expenditures within the prescribed limits. It is in his own language because he knows what direct labor hours are, and can readily see how the addition or reduction of one or more

WE. 48 T-33-25-1284

DEPARTMENTAL INDIRECT EXPENSES BUDGET AND ACTUAL

EXHIBIT 8.

Drill Press 90-A Dept. Week Ended ..... 193..

Mr. Barrie Foreman 75 Per Cent Capacity

	NO.		WEEK BUDGET	WEEK ACTUAL	MONTH (....Weeks) BUDGET	MONTH (....Weeks) ACTUAL
	03	Inspectors				
	04	Clerical Force	29 00	27 00		
	11	Oilers, Sweepers and Cleaners	15 00	14 00		
	12	Internal Transportation	8 00	10 00		
	13	Personnel Adjustment				
	14	Idle or Lost Time				
	15	Other Indirect Labor	50 00	46 00		
		Total Indirect Labor (Items 11-15)	73 00	70 00		
	20	Fuel				
	21	Sand				
	22	Nails, Rods and Wires				
	23	Binders and Facings				
	24	Grinding and Polishing Wheels	6 00	24 00		
	25	Paints, Lubricants and Waste	6 00	2 00		
	26	Stationery and Office Supplies	1 00	2 00		
	27	Miscellaneous Supplies	5 00	1 00		
	28	Purchased Electricity				
		Total Operating Supplies	18 00	29 00		
	41	Buildings				
	42	Machinery	45 00	16 00		
	43	Motors	9 00	14 00		
	44	Semi-durable Tools and Instruments	135 00	120 00		
	45	Internal Transportation Equipment				
	46	Carting Equipment				
	47	Furniture and Office Appliances				
	48	Flask Equipment				
	49	Patterns				
	50	Miscellaneous Equipment	4 00	-		
		Total Maintenance	193 00	150 00		
	60	Re-arrangement of Equipment				
	65	Employees' Welfare	3 00	-		
	71	Miscellaneous Expense	4 00	5 00		
		Total Sundry	7 00	5 00		
		TOTAL ABOVE CHARGES	320 00	281 00		
	02	Foremen	45 00	45 00		
		Total Charges (Except Fixed Charges)	365 00	326 00		
		Variance (Black—Under, Red—Over)				
		Direct Hours	1,500	1,508		
		Cost per Direct Hour				

EXHIBIT 4

"B" WORKS
BURDEN ABSORPTION AT VARIOUS CAPACITIES
PER WEEK - 1935

% Operating Capacity	Direct Hours	Variable Expense Budget	Depreciation	Insurance and Taxes	Total Works Indirect Expenses	Absorption at $.949 Per Direct Hour	Under-Over x Absorbed
40 %	20,389	$ 22,181	$ 2,720	$ 1,603	$ 26,504	$ 19,349	$ 7,155
45	22,937	23,240	2,892	1,603	27,735	21,767	5,968
50	25,485	24,231	3,064	1,603	28,898	24,185	4,713
55	28,034	25,658	3,236	1,603	30,497	26,604	3,893
60	30,582	26,536	3,409	1,603	31,548	29,022	2,526
65	33,131	27,360	3,581	1,603	32,544	31,441	1,103
70	35,679	28,036	3,753	1,603	33,392	33,859	467 x
75	38,228	28,810	3,925	1,603	34,338	36,278	1,940 x
80	40,776	29,677	4,097	1,603	35,377	38,696	3,319 x
85	43,325	30,565	4,269	1,603	36,437	41,115	4,678 x
90	45,873	31,302	4,441	1,603	37,346	43,533	6,187 x
95	48,422	32,212	4,613	1,603	38,428	45,952	7,524 x
100	50,970	32,854	4,785	1,603	39,242	48,371	9,129 x
105	53,519	33,648	4,957	1,603	40,208	50,790	10,582 x
110	56,067	34,442	5,129	1,603	41,174	53,208	12,034 x
115	58,616	35,236	5,301	1,603	42,140	55,627	13,487 x
120	61,164	36,030	5,473	1,603	43,106	58,045	14,939 x
125	63,713	36,824	5,645	1,603	44,072	60,464	16,392 x

x Indicates red figures.

productive workers will affect his operating capacity. He also knows in advance what is promptly expected of him in the way of expense reduction when his capacity drops, and what additional expenses may be incurred when volume increases.

Promptly at the close of each week, the productive hours worked in each department are determined for calculating actual capacities worked. If you will turn to Exhibit 3 you will see on the lower line in the "Actual" column that 1,508 direct hours were worked. Referring to Exhibit 2 you will note that the nearest established capacity is 1,500 direct hours, or 75% capacity. Therefore, the various expense allowances or budgets for that capacity are transcribed in the budget column of Exhibit 3; the actual expenses for the department are listed in the actual column, and any expenses which are out of line are circled with red pencil or otherwise marked for special attention. Each foreman or supervisor is then furnished with the report of his department, and a set of reports for all departments given to the plant manager for his follow-up.

Statistical Control of Results

You will note that our entire discussion of budgetary control thus far has centered on the direct control of costs and expenses by the individual foremen and department heads, which, as we have stated, is the only completely effective method of controlling such items. But there are further important uses of the budget data with which the general organization executives are concerned. In fact, the statistical uses of the budget data, which will now be outlined, result in an over-all picture of the forecasted results and indicate whether the individual budgets as set will finally produce the desired corporate result.

Consider the case of plant indirect expenses. Burden absorption rates are intended to apply a normal amount of the plant overhead to each article fabricated, on some equitable basis, that will result in completely distributing the entire plant expenses at some reasonable rate of operating capacity. When operations are lower than that reasonable point, undistributed, or unabsorbed burden results. Conversely, higher operations result in over-absorbed burden balances. Thus, the records usually indicate through under- or over-absorbed balances, the penalty for insufficient volume or the premium for additional volume.

The use of a variable plant expense budget, such as we have described, makes possible the preparation of a summary which will indicate (1) the total plant expenses proper for any given volume, (2) the amount of burden that will be absorbed, and (3) the resulting under- or over-absorbed burden balance at any operating capacity.

Please refer now to Exhibit 4—Burden Absorption At Various Capacities. The first three columns, representing per cent operating capacity, direct hours, and variable expense budget, represent the summarized figures for the entire plant as taken from the various departmental budgets similar to that shown on Exhibit 2. Depreciation is computed on a per unit of output basis, although a straight line basis could be used similar to that for insurance and taxes The column for total works indirect expense is, of course, a total of the preceding expense columns The column for absorption, at $.949 per direct hour, represents the average applied burden rate times the number of direct hours shown in the second column. The final column shows the point at which burden will be completely absorbed, also the resulting under- or over-absorbed burden at other operating capacities.

Uses of a Table of Burden Absorption at Various Capacities

Such a tabulation may be used, in part, as follows:

(a) To indicate whether expense budgets have been set within limits that will permit complete burden absorption at a reasonable capacity, and if not, to show the extent to which budgets will have to be reduced to permit such complete absorption.

(b) To allocate the responsibility for burden balances to their individual causes, i.e., failure to remain within expense budget limitations, or inadequate volumes. The first is a responsibility of the shop management, the second usually that of the sales division.

(c) To show just how the sales quotas will affect operating capacities and whether such proposed quotas will result in efficient capacities at each plant.

(d) To show the out-of-pocket cost of taking any additional amount of business, by computing the direct hours required to process the new business, and then referring to

the summary to show the additional capacity which such hours would involve, with the consequent extra expense as shown for the higher operating capacity

(e) To compute the profit or loss result for any amount of business that may be produced

Complete Budget of All Activities

It is a relatively simple matter from this point to completely budget the corporation's activities For instance, direct hours can readily be converted into the billing dollars which such hours would produce Therefore, a corporation summary might show columns for per cent operating capacity, billing dollars, direct material and labor costs, indirect expenses as taken from Exhibit 4, and the various fixed budgets for selling, general administrative expenses, and any other items forming a part of the income accounts. The result would be a corporation budget that would show the volume of billings that could be produced at any capacity, the various costs of producing each such volume, and the resulting net profit or loss for any capacity or volume.

Works Operating Results

Let us assume that the corporation budget for the year has been so set as to provide for a satisfactory result at the established sales quota. But we know that orders are rarely booked and processed at a uniform rate throughout the year. Therefore in the plant, where production is fluctuating, a uniform or fixed budget is of little use.

In measuring the month's operations provision must be made not only for a variation in billings from the budget, but also for production which may have occurred at yet another rate.

Exhibit 5, which summarizes the plant operations each month for the works and other executives, shows how such results may be closely controlled:

(a) The second section, captioned "Financial," shows in the "Fixed Budget" column the fixed works budget for the year divided by twelve to place it on a monthly basis.

(b) The "Variable Budget for Actual Volume" column shows the actual volume billed, the normal shop cost budget, the unabsorbed balance as budgeted for the actual capacity worked, and the other budget allowances.

HO 1999-1-35 WORKS OPERATING RESULTS EXHIBIT B.

Works "S"

Month Ending December, 1935

BOOKINGS - BILLINGS - UNFILLED ORDERS	Quota	Actual	Under-Over Quota
Unfilled Orders Balance January 1st	-	1,366,657	-
Net Bookings	500,000	793,675	293,675
	-	2,160,332	-
Net Billings	461,538	325,281	136,257x
	-	1,835,051	-
Adjustments to Unfilled Orders for Freight, etc.	-	4,087	-
Balance End of Month	-	1,839,138	-

FINANCIAL	Fixed Balanced Budget	Variable Budget For Actual Volume	Actual Result	Under-Over Variable Budget
Billings (Less Special Discounts, etc.)	461,538	325,281	325,281	-
Less:				
Normal Shop Cost	350,769	247,214	242,396	4,818
Unabsorbed Works Indirect Expenses	11,068x	6,692	6,146	546
Total Shop Cost	339,701	253,906	248,542	5,364
Gross Trading Profit	121,837	71,375	76,739	5,364
Deduct:				
General-Administrative Expenses	12,724	12,724	12,385	339
Selling Expenses	57,400	57,400	59,663	2,263x
Reserve for Uncollectible Accounts	2,308	1,624	1,543	81
Development Expenses	2,169	2,169	2,696	527x
Total Deductions	74,601	73,917	76,287	2,370x
Net Works Income	47,236	2,542x	452	2,994

STATISTICAL	Balanced Budget Allowance	Variable Budget For Actual Volume	Actual Result	Under-Over Variable Budget
Works Indirect Expenses	139,848	126,636	126,792	833
Application Engineering	-	-	-	-
Unabsorbed Works Indirect Expenses	11,068x	6,692	6,146	546
Defective and Spoiled Work Cost	9,231	6,506	8,132	1,626x
No Charge Order Cost	4,615	3,253	847	2,406
Total Def. Spld. Wk. & N. C. O. Cost	13,846	9,759	8,979	780
Total Cost Per Billing Dollar	.030	.030	.028	.002

	Total Metal	Total Castings	Defective Castings	Defective % Total Castings
Iron Foundry - Tons	540.6	395.0	16.1	4.1 %
Brass Foundry - Pounds	-	-	-	-

Inventories:	First of Month	End This Month	Decr.-Incr. This Month
Finished Machines	442,274	463,375	21,101x
Manufactured Parts	1,237,598	1,254,073	16,475x
Material and Supplies	268,532	267,634	899
W-I-P Net (Actual)	858,953	890,324	31,371x
Consigned Stock	539,485	549,926	10,441x
Total Inventories	3,346,843	3,425,332	78,489x

x Indicates red figures.

Comptroller's Office.

(c) The "Actual Result" column, of course, shows actual results as they would appear on any income statement.

The difference between the profit results shown in the first and second columns is due to the fact that billings and production were less than the quota. This condition is not disturbing because a glance up at the first section shows that bookings actually exceeded the quota, and therefore it is only a matter of time before billings must do likewise A further glance at the bottom section "Inventories," confirms our assurance, because it shows that the amount of inventories required to fill orders increased materially during the month.

The difference between the second and third columns is the variation for which the various departments are currently responsible. That is why the final column shows these differences, which are, of course, further analyzed by the detailed budgets of each department.

The second headed "Statistical" explains some of the reasons for variations in the actual from the budget figures.

Here, then, is a complete control representation of the long term fixed budget; what the result should be for the actual billings, and volume produced; and then the final result; and some causes for the variations.

Similar reports are made for the period to date. If all such works reports are totaled and certain general corporation items added, the picture for the entire corporation budget is complete.

Summary

To summarize, a budget plan, such as we have outlined, should result in the following:

1. A thorough review, department by department, of every expense and function throughout the corporation; a searching inquiry of the need for every item of expense. This review alone may save many times the cost of the entire budget study.
2. A definite allocation of responsibility to every supervisor throughout the corporate activity, not only for performing his physical work, but for doing so at a profitable basis as provided by the budget.
3. A greater appreciation of the values being used in a department, when the costs of all supply and labor items are

known to all department heads and foremen. Greater appreciation for values usually makes for greater care in their handling.

4. The elimination of lag in expense reduction in periods of decreasing production, and the prevention of unwarranted increases when volume expands.
5. A constant focusing of attention upon the profit goal, with all proposed acts interpreted in the light of how they may or may not help to achieve the desired result.

If you agree that *any* of these results are desirable, then the budget can justify itself. If you agree that *all* of these results will help management to a more complete realization of its purpose, then the budget is indispensable.

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